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10/673,056

09/26/2003

Abdo Y. Alfakih

Alfakih 1-1-1-6-24

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EXAMINER

CHU, WUTCHUNG

ART UNIT

PAPER NUMBER

2619

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/673,056

Applicant(s)

ALFAKIH ET AL.

Examiner

Wutchung Chu

Art Unit

2619

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29 and 30 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-15,17,18 and 20-28 is/are rejected.
- 7) ☒ Claim(s) 5 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/24/2007, 5/16/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This communication is in response to application's amendment filed on 8/10/2007. Claims 1, 3-15, 17-30 are pending. Claims 2 and 16 are canceled and claims 29 and 30 are new.

Priority

2. Applicant's claim for domestic priority under 35 U. S.C. 119(e) is acknowledged.

Claim Rejections - 35 USC § 103

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-4, 6-15, 17-18, and 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinomiya et al. (US7188280) in view of Doshi et al. (US2004/0008619).

Regarding claim 1, Shinomiya et al. discloses a protecting route design method in a communication network (**see column 1 line 64-66**) comprising:

- receiving one or more demands for service (**see column 4 line 2-4**) in a mesh network (**see column 11 line 17**) comprising a plurality of nodes interconnected by a plurality of links (**see column 4 line 10 and 53**); and
- mapping each of the one or more demands onto a primary path (**see column 4 line 8-9 where the term working communication route corresponds to primary and see figure 1 working communication route**) and a restoration path (**see figure 1 protecting communication route**) in the network to generate a path plan for the one or more demands in the network (**see column 3 line 64**), wherein

Shinomiya et al. discloses all the subject matter of the claimed invention with the exception of:

- specifying a threshold corresponding to a number of failure-related cross-connections; and
- reduction of a portion of restoration time associated with failure-related cross-connections in the network is taken into account during the mapping,
- the mapping generates the path plan based on the specified threshold such that, for all nodes in the mesh network, the number

of failure-related cross-connections at each node is less than the specified threshold.

Doshi et al. from the same or similar fields of endeavor teaches the use of the maximum cross connect load was computed (**see Doshi et al. paragraph 51 corresponds to the term threshold**), the number of XC request to be processed at a node for each failure is referred to as the XC load at that node for that failure (**see Doshi et al. paragraph 50 corresponds to the number of failure-related cross-connection**), the maximum XC load and the associated worst-case restoration time can be reduced by the demand bundling (**see Doshi et al. paragraph 50 corresponds to the reduction of a portion of restoration time**), and the same traffic was then routed with bundling of demands between source destination pairs of nodes (**see Doshi et al. paragraph 52 corresponds to the path plan**).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the inter-nodal demand bundling as taught by Doshi et al. in the protecting route design method in a communication network of Shinomiya et al. in order to reduce restoration time (**see Doshi et al. paragraph 50**).

Regarding claim 3, Shinomiya et al. teaches the mapping results in a maximum number of failure-related cross-connections at all nodes in the network (**see column 6 line 62-67**) being within a specified tolerance of a theoretical minimum (**see column 8 line 47-52**).

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Regarding claim 4, Shinomiya et al. teaches a graph-theoretic condition (see column 6 line 52-55) is used to derive the theoretical minimum (see column 8 line 47-52).

Regarding claim 6, Shinomiya et al. teaches the mapping sequentially evaluates each possible path plan (see column 4 22-27) for each of the one or more demands and selects the path plan having a smallest maximum number of failure-related cross-connections (see column 6 line 63-67 and column 7 line 10-13).

Regarding claim 7, Shinomiya et al. teaches the mapping comprises:

- selecting two node-disjoint paths for each demand (see figure 1 working communication route and protecting communication route), wherein leveling of link loads (see column 6 line 52-55) is taken into account during the selecting; and
- for each demand, identifying one of the two node-disjoint paths as the primary path and the other as the restoration path (see figure 1 working communication route and protecting communication route), wherein a maximum number of failure-related cross-connections at all nodes in the network (see column 6 line 62-67 and column 7 line 4-13) is taken into account during the identifying.

Regarding claim 8, Shinomiya et al. teaches wherein:

- selecting the two node-disjoint paths for each demand minimizes maximum link bandwidth in the network **(see column 7 line 10-13);** and
- identifying the primary and restoration paths **(see figure 1 working communication route and protecting communication route)** for each demand results in the maximum number of failure-related cross-connections at all nodes in the network **(see column 6 line 62-67 and column 7 line 4-13)** being within a specified tolerance of a theoretical minimum **(see column 8 line 47-52).**

Regarding claim 9, Shinomiya et al. teaches a tent pole condition **(see column 7 line 10-13)** is used to derive the theoretical minimum **(see column 8 line 48-52).**

Regarding claim 10, Shinomiya et al. teaches mixed-integer programming is used in each of the selecting and the identifying **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer).**

Regarding claim 11, Shinomiya et al. teaches genetic programming is used in each of the selecting and the identifying **(see column 11 line 12 where CPU corresponds to programming; it is inherent that CPU is run by a**

program, and column 6 line 50-57 teaches parameter of each node which corresponds to mixed-integer).

Regarding claim 12, Shinomiya et al. teaches a commercial solver is used in each of the selecting and the identifying **(see column 8 line 48-57).**

Regarding claim 13, Shinomiya et al. teaches the mapping involves demand bundling, wherein demands having a common source node and a common destination node are grouped **(see column 4 line 2-6 it is inherent that demands would have a common source node and a common destination node)** and routed along a single pair of disjoint primary and restoration paths **(see figure 1 working communication route and protecting communication route)** and at least a portion of connection signaling for the group is carried out jointly **(see column 4 line 2-6).**

Regarding claim 14, Shinomiya et al. teaches the mapping involves traffic aggregation, wherein multiple low-rate channels in the network are consolidated into a high-rate channel and rerouting of the high-rate channel requires fewer cross-connections than rerouting of the multiple low-rate channels **(see column 4 line 22-27).**

Regarding claims 15-18, 20-28 Shinomiya et al. and Doshi et al. disclose network management system **(see figure 4 box 10 and column 7 line 27 corresponds to network manager)** and all the limitations as discussed in the rejection of method claims 1-4, 6-14 and are therefore system claims 15-18, 20-28 are rejected using the same rationales.

Allowable Subject Matter

6. Claim 5 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 29 and 30 are allowed. The reason for allowance is because the cited references do not teach the combinational limitation of:

- receiving one or more demands for service in a mesh network comprising a plurality of nodes interconnected by a plurality of links; and
- mapping each of the one or more demands onto a primary path and a restoration path in the network to generate a path plan for the one or more demands in the network, wherein:
 - reduction of a portion of restoration time associated with failure-related cross-connections in the network is taken into account during the mapping;
 - the mapping results in a maximum number of failure-related cross-connections at all nodes in the network being within a specified tolerance of a theoretical minimum;
 - a graph-theoretic condition is used to derive the theoretical minimum; and
 - the theoretical minimum is defined by $\max_{n \in N} \{ \lfloor n/d_n \rfloor \}$ where n , a node in the

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- network, is an element of N , the set of all nodes in the network, 8_n is the number of unit demands terminated on node n , and d_n is the number of edges incident on node n .

Response to Arguments

8. Applicant's arguments with respect to claim 1, 3-15, 17-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Crolsin (US6075766)

Crolin (US5881048)

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

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the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wutchung Chu whose telephone number is 571 270 1411. The examiner can normally be reached on Monday - Friday 1000 - 1500EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan D. Orgad can be reached on 571 272 7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WC/
Wutchung Chu

EDAN D. ORGAD
SUPERVISORY PATENT EXAMINER

Edan Orgad 10/28/07